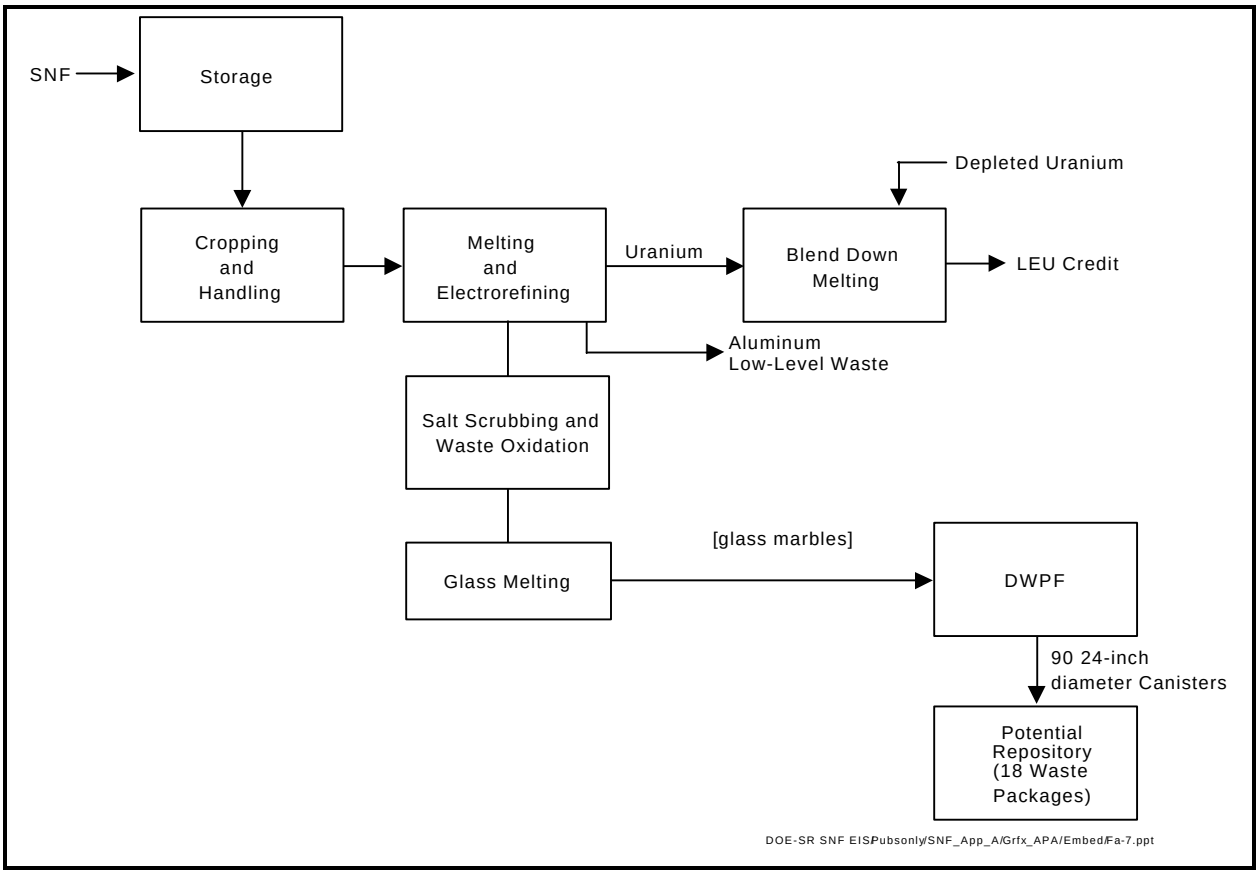

Figure A-7. Electrometallurgical Treatment process flow diagram.

A.2.8 TECHNOLOGIES NOT ANALYZED

This section describes technologies that DOE considered but did not analyze further in the EIS because the technologies need further research to demonstrate they are technically viable and cost effective. These technologies have not undergone bench-scale demonstrations.

Chloride Volatility

Chloride volatility is an advanced treatment technology being investigated at the Idaho National Engineering and Environmental Laboratory. The process segregates major nonradiological constituents from SNF for the purpose of volume reduction, and isolates the fissile material to produce a glass or ceramic waste form.

The process is based on completely volatilizing the fuel elements and separating the gaseous constituents. The fuel would react with chlorine gas at a temperature greater than 1,200°C (2,200°F) to produce volatile chlorides. The fission products and transuranics would be separated by passing the gas through molten zinc chloride in a counter-current scrubber. The gases minus the fission products and transuranics would flow through a series of condensers to remove chloride compounds by fractional distillation. The series of uranium chlorides could be recovered separately, if desired.

The molten zinc chloride would be regenerated by vacuum distillation to recover it for recycle. The fission product and transuranic residue would be converted to oxides or fluorides by fluorination for vitrification and melting with glass frit additives. As an alternative, the residues could be oxidized by boric acid at high temperatures. The transuranics could be separated from the fission products by solvent extraction if separate disposal were necessary.

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